

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY  
(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/US2005/002462

International filing date (day/month/year)  
21.01.2005

Priority date (day/month/year)  
23.01.2004

International Patent Classification (IPC) or both national classification and IPC  
C07D213/61, C07D213/73, C07D213/82

Applicant  
E. I. DUPONT DE NEMOURS AND COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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AP3 Rec'd PCT/PTO 20 JUN 2005

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US2005/002462

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US2005/002462

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-27
	No: Claims	
Inventive step (IS)	Yes: Claims	1-27
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-27
	No: Claims	

2. Citations and explanations

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/002462

**Re Item V.****1 Reference is made to the following documents:**

- D1 : HERTOGEN DEN H J ET AL: "THE CHLOROPYRIDINES" RECUEIL DES TRAVAUX CHIMIQUES DES PAYS-BAS, ELSEVIER SCIENCE PUBLISHERS. AMSTERDAM, NL, vol. 69, 1950, pages 673-690, XP008048639 ISSN: 0165-0513
- D2 : DE 16 95 659 B (RUETGERSWERKE AG)
- D3: US-A-3 838 136 (BLANK A,US)
- D4: TETRAHEDRON LETTERS., vol. 26, no. 40, 1985, pages 4903-4906,
- D5: DATABASE CROSSFIRE BEILSTEIN; Database-accession no. 1098214 (BRN)
- D6: US-A-4 082 749 (QUADBECK-SEEGER ET AL)
- D7: DATABASE CROSSFIRE BEILSTEIN; Database-accession no. 383619 (BRN)

**2. Novelty**

Document D1, which is considered to represent the most relevant state of the art, discloses also a process for preparing the 2,3-dichloropyridine of formula (1) from the 3-amino-2-chloropyridine of formula (2) by diazotization, wherein copper powder instead of copper (II) is used (see especially p. 689, last paragraph; p. 690, paragraph 3).

D2 refers to a process for the preparation of 2-chloropyridine compounds starting from the corresponding 2-aminopyridine compounds instead of a 3-amino-2-chloropyridine.

Documents D3-D5 describe processes for the preparation of 3-amino-2-chloropyridine (2) starting from 3-aminopyridine (3) according to present dependent claim 13.

Documents D6-D7 refer to processes for the preparation of compound (3) by contacting nicotinamide (4) with a strong base and a halogenating agent according to present dependent claim 20.

The subject-matter of claims 1-27 is therefore novel (Article 33(2) PCT).

**3. Inventive step**

Starting from the closest prior art D1 (see also page 1, lines 4-10 of the current application) the problem underlying the present invention should be seen in the provision of an

improved process for preparing 2,3-dichloropyridine.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

In view of example 1, it is credible that the problem as defined above has actually been solved by the technical measures of claim 1.

From the teaching of D1 as well as D2 (see especially page 2, column 2, lines 1-4) it was not foreseeable that the use of a copper catalyst wherein at least 50% of the copper is the copper (II) oxidation state during the reaction of the corresponding diazonium chloride salt with hydrochloric acid would be responsible for improved yields.

Claims 1-27 meet the criteria of Art. 33 (3) PCT.

**Re Item VIII.**

The term "about" used in claims 9-12, 16-20 and 24-27 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT).